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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/530,783

09/28/2005

Richard P. Anderson

11A.1 U.S

9391

43008

7590

12/11/2007

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EXAMINER

FOGARTY, CAITLIN ANNE

ART UNIT

PAPER NUMBER

4116

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/530,783	<b>Applicant(s)</b> ANDERSON ET AL.	
	<b>Examiner</b> CAITLIN FOGARTY	<b>Art Unit</b> 4116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/6/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Application***

1. Claims 1 – 27 are pending and presented for this examination.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) was submitted on March 6, 2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Please refer to applicant's copy of form PTO-1449 submitted herewith.

### ***Claim Objections***

3. Claim 25 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Claim 25 is dependent on claim 18 which recites the use of a chloride vapor in the method. However, claim 25 recites the use of a halide vapor which is broader than a chloride vapor and therefore does not limit the subject matter of claim 18. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 – 7, 18, and 26 – 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Armstrong et al. (US 5,958,106).

In regards to claims 1 – 3, 6, and 18, the abstract, col. 1 lines 13 – 24, col. 3 lines 56 – 61, col. 4 lines 14 – 23, and claim 1 of Armstrong et al. disclose a method of producing a non-metal element or a metal or an alloy thereof from a halide or mixtures thereof. The halide or mixtures thereof are contacted with a stream of liquid alkali metal or alkaline earth metal (reducing metals) or mixtures thereof in sufficient quantity to convert the halide to the non-metal of the metal or alloy for which the reduction of the halide to the element is exothermic. More specifically, Armstrong et al. discloses a method of producing an elemental material of Ti, Al, Sb, Be, B, Ga, Mo, Nb, Ta, Zr, V, Ir, Os, Re and U or an alloy thereof from a halide vapor of the elemental material or mixtures thereof comprising submerging the halide vapor or mixtures thereof in liquid alkali metal or liquid alkaline earth metal or mixtures thereof to convert the halide vapor to elemental material or an alloy. Finally, the products leaving the reaction zone are quenched (rapidly cooled) to avoid sintering and the particulate reaction products are removed from the product stream. More specifically, Armstrong et al.

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teaches a particular method of producing a titanium metal element or an alloy in an exothermic reaction between the vapor chloride of the metal element ( $\text{TiCl}_4$ ) and a liquid phase reducing metal of an alkali metal, Na.

Regarding claims 4 and 7, claim 2 of Armstrong et al. discloses that the liquid alkali metal is Na, K, or mixtures thereof and the liquid alkaline earth metal is Mg, Ca, Ba or mixtures thereof.

In regards to claim 5, col. 3 lines 56 – 61 of Armstrong et al. discloses the method wherein the elemental material includes titanium and the Na is flowing.

Regarding claims 26 – 27, Armstrong et al. teach the methods of claim 1 and claim 18, as discussed above, including the product obtained from these methods. Claims 26 and 27 are product-by-process claims and “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

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be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al. (US 5,958,106).

In regards to claim 8, col. 1 lines 33 – 38 of Armstrong et al. disclose that both magnesium and sodium reduction of titanium tetrachloride have proven to be commercial methods for producing titanium metal. Therefore, it would have been obvious to one of ordinary skill in the art to perform the method of the instant invention wherein the elemental material includes titanium and the Mg is flowing.

9. Claims 9 – 16 and 19 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al. (US 5,958,106) in view of Okudaira et al. (US 4,902,341).

In regards to claims 9 – 12 and 19 – 24, Armstrong et al. disclose the limitations of claim 2, from which claims 9 and 10 are dependent, and claim 18, from which claim 19 is dependent, as discussed above in the 102(b) rejection.

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Armstrong et al. differs from claims 9 – 12 and 19 – 24 in that it does not teach that the alloy is substantially Ti, Al, and V, more specifically Ti-6% by weight Al-4% by weight V, which is formed by introducing the chlorides thereof as vapor into a liquid phase of a reducing metal. They also do not teach the method wherein the reducing metal is Na, the inert sweep gas is Ar and the alloy is Ti-6% by weight Al-4% by weight V or the method wherein the reducing metal is Mg, the inert sweep gas is Ar and the alloy is Ti-6% by weight Al-4% by weight V.

It would have been obvious to one of ordinary skill in the art to modify Armstrong et al. in view of Okudaira et al. because in col. 5 lines 7 – 20, col. 6 lines 53 – 61, and Example 1 Okudaira et al. teach the method wherein the alloy is Ti-6% by weight Al-4% by weight V and the halide is a chloride. The liquid phase reducing metal can either be magnesium or sodium as taught in col. 4 lines 49 – 54. Additionally, Okudaira et al. teach that the reaction product is cooled with an inert gas such as argon. The inert gas is cooler than the reaction products and cools the reaction along with separating chloride vapor from the reaction products which would have been obvious to one of ordinary skill in the art.

Regarding claim 13 – 16 and 25, Armstrong et al. disclose the limitations of claim 1, from which claims 13 and 16 are dependent, and claim 18, from which claim 25 is dependent, as discussed above in the 102(b) rejection.

Armstrong et al. differs from claim 13 because they do not teach that the temperature of the particulate elemental material or alloy thereof is maintained at or below the boiling point of the halide salt of the reducing metal.

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It would have been obvious to one of ordinary skill in the art to modify Armstrong et al. in view of Okudaira et al. because in col. 7 lines 48 – 56 Okudaira et al. teach that the temperature of the reaction zone is kept at a temperature above a melting point of the titanium alloy product and at a pressure at least above the vapor pressure of the reducing metal agent at that temperature which allows the reducing metal agent and its chloride to be kept in liquid form in the reaction vessel while being substantially prevented from boiling. Therefore, the temperature of the elemental material or alloy thereof must be maintained at or below the boiling point of the halide salt of the reducing metal in order for the elemental material to remain in the liquid phase.

Armstrong et al. differs from claims 14 – 16 and 25 because they do not teach that an inert sweep gas flows either countercurrently or co-currently to the particulate reaction products or that any excess halide vapor present is separated from the reaction products.

It would have been obvious to one of ordinary skill in the art to modify Armstrong et al. in view of Okudaira et al. because in Fig.1 of Okudaira et al. displays that the inert gas, which flows in through pipe 3, flows co-currently with the particulate reaction products, which flow out through pipe 13. Therefore, the excess inert gas would have to be removed from the alloy product as disclosed in col. 3 lines 14 – 18. Although Okudaira et al. do not specifically teach that the inert sweep gas can also flow countercurrently to the particulate reaction products it would have been obvious to one of ordinary skill in the art situate the argon gas input so that the argon flows countercurrently or co-currently because



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the direction of flow of the argon does not change the final particulate reaction product. However, one benefit of countercurrent flow is that the inert gas would separate any excess vapor halide of the elemental material present from the particulate reaction products before separation of the particulate halide salt of the reducing metal from the elemental material which would have been obvious to one of ordinary skill in the art. Either direction of argon flow would result in the need to separate the particulate reaction product from non-product to obtain a pure product. For example, the excess inert gas would have to be removed from the alloy product as disclosed in col. 3 lines 14 – 18 of Okudaira et al. Therefore, the position of the argon input would have been obvious to one of ordinary skill in the art after routine optimization through experimentation.

One would have been motivated to modify Armstrong et al. in view of Okudaira et al. because both references teach the method of producing an elemental material from a halide of the elemental material by introducing the vapor halide of the elemental material into a liquid phase of a reducing metal of an alkali metal or alkaline earth metal. The additional steps in the method disclosed by Okudaira et al. make the method capable of continuously producing an elemental alloy of high quality at a low cost on an industrial scale (see col. 2 lines 62 – 68 of Okudaira et al.).

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al.-A (US 5,958,106) in view of Okudaira et al. (US 4,902,341) as applied to claim 16 above, and further in view of Armstrong et al.-B (US 5,779,761).

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Armstrong et al.-A in view of Okudaira et al. differs from claim 17 because they do not teach that the cooled particulate reaction products are contacted with water to separate the halide salt of the reducing metal from particulate elemental material or alloy thereof.

It would have been obvious to one of ordinary skill in the art to modify Armstrong et al.-A in view of Okudaira et al. and further in view of Armstrong et al.-B because in col. 4 lines 14 – 21 of Armstrong et al.-B disclose contacting the reaction product with a water-alcohol wash to remove the halide salt (sodium chloride in this case) present on the particles.

One would have been motivated to modify Armstrong et al.-A in view of Okudaira et al. and further in view of Armstrong et al.-B because all three references disclose the method of producing an elemental material from a halide of the elemental material by introducing the vapor halide of the elemental material into a liquid phase of a reducing metal of an alkali metal or alkaline earth metal. Additionally, Armstrong et al.-B teach a method of separating the halide salt of the reducing metal from particulate elemental material that is inexpensive, but still effective.

### ***Double Patenting***

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees.

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A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1 – 8, 10, 18 – 23, and 26 – 27 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 – 5, 7 – 11, 13 – 16, 19 – 20, and 24 of U.S. Patent No. 5,779,761.

Although the conflicting claims are not identical, they are not patentably distinct

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from each other because US 5,779,761 and the instant application both teach a method of producing an elemental material or an alloy thereof from a halide of the elemental material or halide mixtures comprising introducing the vapor halide of an elemental material or halide mixtures thereof into a liquid phase of a reducing metal of an alkali metal or alkaline earth metal with overlapping scope.

13. Claims 1 – 3, 6, 18, 21, 23, 26, and 27 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 28 of copending Application No. 10/530,775. Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending applications teach a method of producing an elemental material or an alloy thereof from a halide of the elemental material or halide mixtures comprising introducing the vapor halide of an elemental material or halide mixtures thereof into a liquid phase of a reducing metal of an alkali metal or alkaline earth metal with overlapping scope.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CF

/Vickie Kim/  
Supervisory Patent Examiner, Art Unit 4116